I. CATALOG DESCRIPTION:

AERO 109: Airframe Maintenance Laboratory – Systems and Components.
15 hours lab = 5 units

This Laboratory section of the Federal Aviation Administration approved curriculum provides training in airframe structures and airframe systems and components. Topics covered include aircraft welding; electrical circuits; and basic aircraft systems for power landing, brakes, warning, instrumentation, auto-pilot, cabin atmosphere control, ice and rain control, fire protection and communications.

Prerequisite/Corequisite: AERO 101: Airframe and Power Plant General Curriculum and AERO 107: Airframe and Power Plant General Laboratory – Servicing/Materials
Corequisite: AERO 103: Airframe maintenance Lecture – Systems and Components

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES FOR STUDENTS:

Upon completion of the course the student should be able to:

A. Accomplish those basic areas which the Federal Aviation Administration outlines in Federal Aviation Regulation, Part 147, as necessary to satisfactorily pass the FAA examinations (written, oral, and practical).

B. Research textbooks, maintenance manuals and other written materials and be able to explain in writing and verbally the operation, servicing, troubleshooting and repair of aircraft systems and components.

C. Research Airworthiness Directives, Federal Aviation Regulations, Type Certificate Data Sheets and Advisory Circulars and determine applicability to specific aircraft.

D. Write concise, yet adequately descriptive evaluations of aircraft damage or equipment malfunctions and write concise, descriptive corrective actions for repair, replacement, or servicing of aircraft components.

E. Read and follow written instructions in the performance of task on aircraft including filling out FAA form 337, Major Repair and Alterations Forms, and associated maintenance record entries to FAA standards.

F. Compare and contrast different types of systems and or repair procedures and explain advantages and disadvantages in relation to acceptability for different applications.

G. Draw diagrams, systems and circuits for systems and components. Recognize and label components and symbols, show through symbols and colors, flow

patterns, and critical changes in temperatures, pressures, velocity and volume.

H. Accomplish practical projects necessary to meet skill levels required to do necessary overhaul and maintenance task on aircraft.

IV. CONTENT:

A. GENERAL INFORMATION

B. SHOP SAFETY
1. General shop safety.
2. Aeronautics Department safety statement.
3. Technical Division safety statement.
4. Complete safety test statement.
5. Welding safety statement.

C. AIRCRAFT WELDING
1. Types of welding.
2 Welding equipment safety and setup.
3. Welding procedures, joints and applications.
4. Inspecting of welded joints.

D. HYDRAULIC/PNEUMATIC POWER SYSTEMS
1. Theory of hydraulics – force, pressure, area, work – related to math.
2. Types of hydraulic systems used in aircraft.
3. Fluids and applications and precautions.
4. System components and fluid lines and fittings.
5. Inspection troubleshooting and repair of hydraulic and pneumatic systems.

E. AIRCRAFT LANDING GEAR AND BRAKE SYSTEMS
1. Types and configurations of landing gear and brake systems.
2. Principle of operation of landing gear and brake systems.
3. Wheel and tire requirements, inspection, repair and replacement.
4. Inspection, troubleshooting and repair of landing gear and brake systems.

F. POSITION AND WARNING SYSTEMS
1. Types of position and warning systems.
2. Operation and applications of different systems.
3. Inspection, troubleshooting and repair of landing gear and brake systems.

G. BASIC INSTRUMENT SYSTEMS
1. Types of instruments used in aircraft.
2. Principle of operation of different types of instruments.
3. Inspection, troubleshooting and repair of instruments.

H. 1. Auto-pilot system components and principles of operation.
2. Inspection, troubleshooting and repair of auto-pilot systems.

I. CABIN ATMOSPHERE CONTROL SYSTEMS
1. Types of cabin atmosphere control systems.
2. Principles of operation and applications of different systems.
3. Inspection, troubleshooting, and repair of cabin atmosphere control systems.

J. ICE AND RAIN CONTROL SYSTEMS
1. Types of ice and rain control systems.
2. Principles of operation and applications of different systems.
3. Inspection, troubleshooting, and repair of ice and rain control systems.

K. FIRE PROTECTION SYSTEMS
1. Types of fire protection systems.
2. Principles of operation and applications of different systems.
3. Inspection, troubleshooting, and repair of fire protection systems.

L. COMMUNICATIONS SYSTEMS
1. Types of communications systems used on aircraft.
2. Principles of operation and applications of different systems.
3. Installations procedures and precautions and operation.
4. Inspection, troubleshooting, and repair.

M. ELECTRICAL CIRCUITS
1. Types of electrical systems and circuits.
2. Electrical theory.
3. AC and DC system and components.
4. Electrical test equipment and uses in troubleshooting.
5. Inspection, troubleshooting and repair of electrical circuits and systems.

V. METHODS OF INSTRUCTION:

1. Lecture.
2. Assignment of writing exercise.
3. Class discussion.
4. Use of Audiovisual aids.
5. Demonstration.
6. Field trips.

VI. TYPICAL ASSIGNMENTS:

A. Read chapters in Aircraft Maintenance and Repair and AC65-15A and
1. Typical Question:
a. Explain the operation of an air cycle machine and how it differs from a vapor cycle air conditioning system. Identify the servicing requirements of each type.

b. For assigned aircraft remove the wheel, tire and brake assembly.

Inspect and write a list of squawks describing the discrepencies found. Be prepared to answer questions from instructor about proper operation and maintenance procedures. Reinstall wheel tire and brake on aircraft and bleed brake following instructions in appropriate manuals.

VII. EVALUATION(S):

A. Methods of evaluation:
   1. Graded assignments.
   2. Quizzes.
   3. Phase Examinations.
   4. Mid-term Examination.
   5. Final Examination.
      Typical Questions:
      a. Using an Volt/Ohm meter evaluate the ten assigned electrical circuits and determine and list which circuits have opens, shorts to ground and which circuits have normal continuity.
      b. Given a hydraulic system with a small piston diameter of 2 inches and a large piston diameter of 6 inches and a system pressure of 100 psi calculate the force applied to the small piston and the amount of force developed by the large piston.

B. Frequency of Evaluation:
   1. Weekly assignments and quizzes.
   2. One mid-term examination.
   3. One final examination.

VII. TYPICAL TEXT(S):

Title: Aircraft Maintenance and Repair
Author: Kroes/Watkins/Delp
Publisher: McGraw-Hill
Date of Publication: 1993

Title: A&P Technician Airframe FAA Exam Book
Author: Federal Aviation Administration
Publisher: ASA Corp.
Date of Publication: 1997

Title: FAR Handbook for Maintenance Technicians
Author: Federal Aviation Administration
Publisher: Iap Inc.
Date of Publication: 1997

IX. OTHER SUPPLIES REQUIRED OF STUDENTS:

A. Calculator
B. Colored pencils

C. Scan-tron sheets